

OFFICIAL  
2002/2011RECEIVED  
CENTRAL FAX CENTER

JUN 03 2004

60,130-1890; 00MRA0574

IN THE SPECIFICATION

Please make the following changes to the specification.

[3] This automatic controlled engagement and disengagement of the front axle is typically initiated independently from the ground conditions. Thus, engagement of the front axle may not be required or may be poorly timed to maintain vehicle tractive effort. Unnecessary engagement of the front axle results in additional wear of the components, which is undesirable. Further, poorly timed time-shifts can damage transfer case and axle components resulting in vehicle downtime and increased costs for replacement components.

[5] An all wheel drive system includes a transfer case assembly that transfers driving torque from a vehicle engine to vehicle drive axles. The transfer case assembly includes an input shaft that receives power source output torque, a rear axle output shaft for transferring driving torque from the transfer case assembly to a the rear drive axle, and a front axle output shaft that is selectively engaged to a the front drive axle under predetermined conditions to achieve all wheel drive. A controller determines the optimal conditions for the engagement and disengagement of the front drive axle.

[18] A declutch mechanism 62 is used to drivingly engage the front axle output shaft 54 to the rear axle output shaft 52 to engage the front drive axle 12. Any known declutch mechanism can be used. The declutch mechanism 62 includes an electrical connector 64 to connect the declutch mechanism 62 to the ECU 32.

60,130-1890; 00MRA0574

[21] If the input shaft 50 and the rear axle output shaft 52 are not within the predetermined speed range, the ECU 32 prevents axle engagement until the shafts 50, 52 are within the predetermined range. The ECU 32 controls the shaft speeds by generating the a-power source control signal 34 to control the output torque and/or generating the wheel a-braking control signal 36 to control wheel brake torque to bring the input shaft 50 and the rear axle output shaft 52 both within the predetermined rotational speed range. The braking torque and power source output torque can be separately controlled or simultaneously controlled depending upon the ground conditions and wheel speeds. For vehicles that do not have brake-by-wire systems, only output torque is controlled. Alternatively, braking torque control can be solely utilized to bring the shafts 50, 52 within the speed range.

[22] When the ground conditions improve, i.e., there is no longer any wheel slip, the ECU 32 signals 38-the transfer case declutch mechanism 62 to disengage from the front drive axle 12. When the axle is engaged, it may be difficult to determine when ground conditions have improved sufficiently. The transfer case could include a spring disengagement mechanism (not shown) or could operate under a time delay to ensure that disengagement does not occur before the desired traction is achieved.